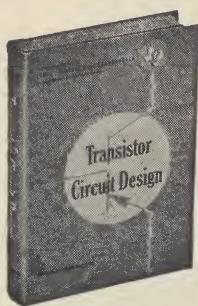


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TRANSISTOR CIRCUIT DESIGN

Prepared by the Engineering Staff of
TEXAS INSTRUMENTS INCORPORATED

edited by JOSEPH A. WALSTON, Transistor Applications Manager
and JOHN R. MILLER, Technical Publications Manager

523 pages, 7½ x 9½, 526 illus., \$15.00 (Payable \$5.00 in 10 days; \$5.00 a month)

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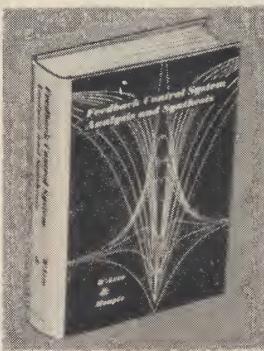
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 - 4. Nature of Transistor Quantities and Parameters
 - 5. Measurement of Electrical Quantities and Parameters
 - 6. Equivalent Circuits and Parameter Interrelationships
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 - 13. Frequency Response and Stability of Feed-back Amplifiers
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Shows you how to analyze and design modern control systems

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824 pages, 6 x 9, 550 illustrations, \$14.50

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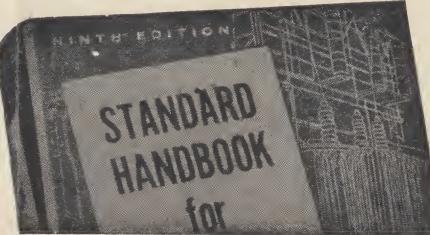
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112 pages, illustrated, \$5.95*

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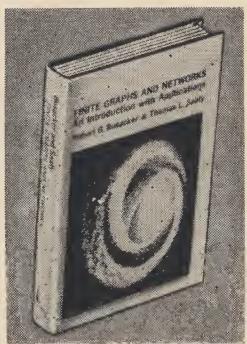
. . . electronic engineers interested in wanting to know the scientific basis for the device properties they work with

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How to use linear graph fundamentals in a wide range of problems



This book gives you a clear, extensive treatment of the fundamentals of the mathematical theory of linear graphs. You'll find it especially useful for its large number and variety of applications in economic, game, social, engineering, scientific, and other mathematical problems. Examples point up basic concepts, and special exercises aid in your self-study use of the book. For those in industrial and military operations research, industrial engineering, systems analysis, economic and social models, and other areas of physical and human sciences, it offers a uniquely useful working tool.

FINITE GRAPHS AND NETWORKS

By ROBERT G. BUSACKER

Research Analysis Corporation

and THOMAS L. SAATY

U.S. Arms Control and Disarmament Agency

294 pages, 6 x 9, 200 illustrations, \$11.50

Fundamental definitions, terms, and symbols describing and classifying undirected and directed graphs are fully covered in this helpful book. It also includes other basic developments centering around various ways of partitioning the elements of graphs and the measurement of distances in graphs . . . properties and characterizations of planar graphs . . . coloring problems . . . algebraic considerations . . . matrices . . . and other analyses.

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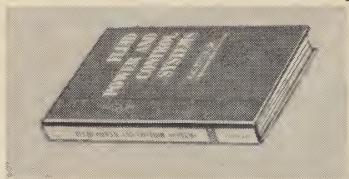
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- multi-commodity flow problems

How to design modern fluid power control systems



AMPLY ILLUSTRATED every step of the way, this helpful book fully covers the fundamentals of fluid power control systems. Aimed toward the area of systems design, it places maximum stress on the specifications of the various component types. The book's easy-to-use format gathers together and organizes an abundance of practical data formerly scattered among many sources.

Key aspects of fluid mechanics—those of primary importance to

FLUID POWER AND CONTROL SYSTEMS

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4. Fluid Motors
5. Basic Circuit Components and Their Symbols
6. Basic Fluid Power Circuits
7. Fluid Circuit Design
8. Component Selection and Design
9. The Distribution System
10. The Reservoir System
11. Heat in the Fluid Power System
12. The Transmission Medium

systems development—are reviewed. Also included is a complete discussion of basic pumps, motors, and valves. Those mathematical considerations pertinent to component selection are presented from a practicing engineer's standpoint. In addition, the book gives a special presentation of the characteristics of the fluid medium.

By ERNEST C. FITCH, JR.

Associate Professor, School of Mechanical Engineering, Oklahoma State University

250 pp., 5 3/8 x 8, 144 illus., \$5.95

ALL-INCLUSIVE IN SCOPE, this valuable book's treatment of fluid power is at the same time strong on practical detail. It introduces basic fluid circuitry and the design of fluid systems, and covers the design and selection of accumulators and fluid cylinders. A unique chapter deals with fluid reservoirs; another presents the practical aspects of heat transfer in fluid systems.

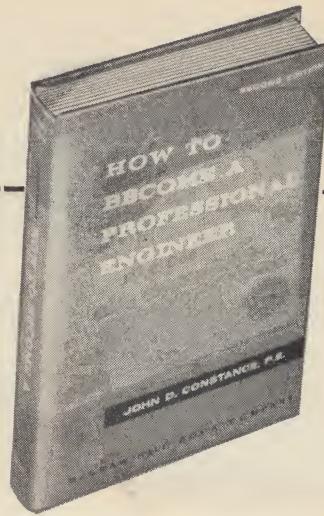
In addition, the book helps you calculate and understand the interrelations of systems components. Among those included are the hydrostatic transmission chart, which relates all controlling variables involved in pump motor systems, and a cylinder rod nomograph, which reduces the normal trial-and-error solution to an accurate one-step method.

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12. What to Look for in Refresher Courses
13. Multiple Registration
14. Eminence—Open Door to Registration
15. The Oral Examination
16. The Engineer's Seal

ABOUT THE AUTHOR

For 20 years John D. Constance has been preparing engineers for licensure in various states. He is an experienced chemical engineer, a Registered Professional Engineer in New York and New Jersey, and holds a certificate of qualification from the National Bureau of Engineering Registration. He is associated with the refresher course and orientation work of ASME, IEEE and ASCE. He has taught and conducted refresher courses for these societies, New York University, the U. S. Army, and many large corporations. A recognized authority and guidance counselor in this specialized field, it is this vast experience that Mr. Constance uses to show you every step of registration procedures to make it easier for you to become a Professional Engineer.



Second Edition

HOW TO BECOME A PROFESSIONAL ENGINEER

By John D. Constance, P.E.
Engineering Registration Consultant

294 pages, 5 3/8 x 8, \$7.50

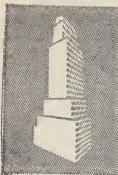
Prepared in cooperation with the National Council of State Boards of Engineering Examiners, this thoroughly updated Second Edition presents the broad picture of licensing procedures in the United States along with the current addresses of the boards and their Canadian counterparts. It gives the recent graduate a course to follow for a successful professional career. It gives the more mature graduate and non-graduate engaged in engineering much needed help in their belated quest for licensure.

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Modern techniques utilizing analog, digital, and hybrid analog-digital computers for random process studies

RANDOM-PROCESS SIMULATION AND MEASUREMENTS

By GRANINO A. KORN

Professor of Electrical Engineering, University of Arizona

Mr. Korn is the author of *Basic Tables in Electrical Engineering*. He is coauthor with Harry D. Husky of *Computer Handbook* and with Theresa M. Korn of *Electronic Analog and Hybrid Computers and Mathematical Handbook for Scientists and Engineers*.

212 pages, 6 x 9, 141 illustrations, \$12.50

THIS AUTHORITATIVE BOOK provides valuable coverage of random-process simulation and random-process measurements—particularly emphasizing computer techniques. In addition to needed theory, it fully describes instrumentation and computing procedures.

Two essential topics are treated—Monte-Carlo-type simulation of control, communication, and detection systems . . . and computer techniques for measurement of random-process parameters, averages, mean squares, correlation functions, spectra, and probabilities—including estimation and control of statistical fluctuation errors.

The volume begins with a review of random-process mathematics and analog/hybrid computation. It describes analog-computer implementation of statistical input-output relations for linear sys-

tems. An important section introduces direct simulation of random phenomena by hybrid-computer Monte-Carlo techniques. Described here are devices and procedures for practical measurement of time and sample averages, correlation functions, and probability distributions—including joint distributions of two random variables.

In addition, the book discusses the theory and practice of statistical measurements with quantized data. Also reviewed are analog and digital methods for power-spectrum estimation . . . and modern analog-hybrid computing techniques for Fourier analysis and impulse-response measurements. The closing section demonstrates the power and sophistication of the hybrid-computer Monte-Carlo technique in terms of some practical examples and applications.

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Introduction	Measurement (Estimation) of Correlation Functions
Statistics as Random Variables	Amplitude-distribution Measurements
Linear Operations and Spectral Densities	
Examples of Random Processes	
2. A Review of Computer Techniques	6. Statistical Measurements with Quantized Data
Introduction and Survey	Statistical Effects of Quantization
Analog Simulation	Hybrid Analog-Digital Measurements Employing
3. Computer Techniques Implementing Statistical	Coarse Quantization
Input-Output Relations	Theoretical Justification
Introduction	7. Measurement of Spectral Densities, Fourier
Time-invariant Linear Systems with Stationary	Components, and System Response
Inputs	Measurements of Spectral Densities and Fourier
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4. Direct Simulation of Random Phenomena:	Analog-computer Fourier Analysis
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Noise Generators	Plotters
Introduction	Impulse-response Measurement through Input-Out-
Monte-Carlo Simulation with Analog/Hybrid Com-	put Correlation
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Random-noise Generators	8. Special Techniques and Applications
Hybrid Analog-Digital Pseudo-random-noise Gener-	Introduction
ators	Some Special Measurement and Sampling Tech-
5. Measurement of Time and Sample Averages,	niques for Statistical Simulation
	Studies of Regression and Prediction
	Simulation of Communication and Detection Systems
	Some System-engineering Applications
	Some Special Monte-Carlo Techniques
	Appendix: Statistical Tables

This modern, comprehensive guide fully explains . . .

Fundamental microwave principles, devices, systems, and applications



HERE IS A DETAILED TREATMENT of the essential theories underlying microwave electronics. The book carefully examines a large number of today's representative devices in order to give you a clear, realistic understanding of each theory's specific applications.

To give you an even firmer grasp of basic concepts, helpful problems are included which illustrate and extend the ideas presented. Two major sections are devoted to equivalent microwave circuit theory and to the analysis

of transmission line circuits, impedance matching, and transformation of impedance level.

In addition, you'll find *extensive coverage of just about every topic of current engineering significance*. Waveguides, cavity resonators, propagation in ferrites and ferrite devices, periodic structures and filters, space-charge waves and microwave tubes, masers, and parametric amplifiers are all fully explained. Each topic is treated in great depth, and the main emphasis throughout is on application of fundamental principles.

FOUNDATIONS FOR MICROWAVE ENGINEERING

CONTENTS

1. Introduction
2. Electromagnetic Theory
3. Transmission Lines and Waveguides
4. Circuit Theory for Waveguiding Systems
5. Impedance Transformation and Matching
6. Passive Microwave Devices
7. Electromagnetic Resonators
8. Periodic Structures and Filters
9. Microwave Tubes
10. Microwave Masers
11. Parametric Amplifiers

EACH MAJOR SECTION in this big volume is subdivided into a number of related subsections. For example, the comprehensive chapter on periodic structures and filters brings you data on such topics as: capacitively loaded transmission-line circuit analysis . . . wave analysis of periodic structures . . . unsymmetrical two-port networks . . . terminated periodic structures . . . group velocity and energy flow . . . Floquet's theorem and spatial harmonics . . . traveling-wave tubes . . . general properties of a helix . . . image-parameter method of filter design . . . insertion-loss method . . . specification of power loss ratio . . . low-pass-filter designs . . . frequency transformations . . . impedance inverters . . . transmission-line filters . . . cavity filters . . . and much more.

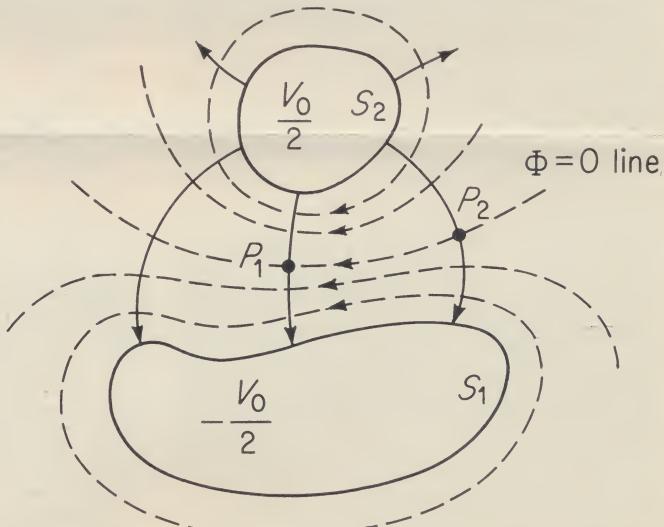
By ROBERT E. COLLIN

Professor of Electrical Engineering, Case Institute of Technology

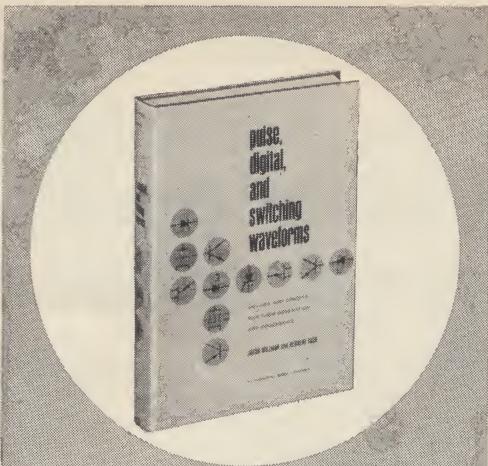
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McGRAW-HILL PHYSICAL AND QUANTUM ELECTRONICS SERIES



This diagram of magnetic flux lines in a transmission line is typical of the book's many helpful illustrations provided to clarify important concepts and devices.



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PULSE AND DIGITAL CIRCUITS

have now produced this new "classic" on
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- Brings engineers abreast of current developments
- Emphasizes semiconductor devices and transistors
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- Considers topics of particular value to practicing engineers

detailed, expert guidance on...

basic circuits and techniques used to generate and process pulse-type signals

Here is a practical treatment of the essential information needed to work creatively with pulse, digital, and switching circuits. Designed to be of maximum value to the practicing engineer, this book provides you with working descriptions of active and passive devices and circuit configurations for the generation and processing of pulse-type signals.

Semiconductor and tube circuits are treated side by side throughout, with principal emphasis on transistors. Circuits are first analyzed on a physical basis, with mathematics used to express quantitative relationships only after clear understanding of the circuit's behavior is established. Commercially available device characteristics are employed for optimum application usefulness.

The book presents methods for generation of very narrow (nanosecond or microsecond) pulses, and also wider (millisecond or second) gates or square waves. It also includes other waveforms — a step, an exponential, a pulse code, a staircase, and a precisely linear ramp. Its discussions of processing show how to make a waveform perform a useful function by transmitting the signal . . . amplifying it . . . selecting a portion of it in voltage . . . choosing a section of it in time . . . combining it with other signals to perform a logic operation . . . and employing it to synchronize a system. The book explains these processes in the detail necessary for rapid and easy application.

pulse, digital, and switching waveforms

check the immense scope of
these chapters:

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 2. Linear Waveshaping: RC, RL, and RLC Circuits
 3. Pulse Transformers and Delay Lines
 4. Wideband Amplifiers (Uncompensated)
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 6. Steady-state Switching Characteristics of Devices
 7. Clipping and Comparator Circuits
 8. Clamping and Switching Circuits
 9. Logic Circuits
 10. Bistable Multivibrators
 11. Monostable and Astable Multivibrators
 12. Negative-resistance Devices
 13. Negative-resistance Switching Circuits
 14. Voltage Time-base Generators
 15. Current Time-base Generators
 16. Blocking-oscillator Circuits
 17. Sampling Gates
 18. Counting and Timing
 19. Synchronization and Frequency Division
 20. Transient Switching Characteristics of Diodes and Transistors
- Appendix A: Ringing Circuit with Nonzero Initial Conditions
- Appendix B: Distribution-parameter Delay Lines
- Appendix C: Lumped-parameter Delay Lines

Devices and Circuits for Their Generation and Processing

By **Jacob Millman, Ph.D.** & **Herbert Taub, Ph.D.**

Professor of Electrical Engineering
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958 pages, 6 3/8 x 9 1/4, 803 illustrations, \$18.00
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ELECTRICAL AND ELECTRONIC ENGINEERING SERIES

The number of circuits and techniques treated in this book is enormous. Its extensive summary of the steady-state switching characteristics of devices covers the semiconductor diode, the avalanche diode, the vacuum diode, the transistor at cutoff and in saturation, the avalanche transistor, and the vacuum triode. *Negative-resistance devices* treated include the tunnel diode, the unijunction transistor, the four-layer diode, the silicon-controlled switch (and its variants), and the avalanche transistor. Two full chapters describe *time-base generators*: voltage ramps, including the phantastron circuit, the Miller integrator, and the bootstrap circuit and current sweeps. In addition, the book gives detailed discussions of transmission networks, differentiating circuits, clippers, comparators, clamps, logic circuits, bistable multis, monostable multis, astable multis, blocking oscillators, sampling gates, counting, synchronization, and pulse amplification, including charge-control analysis.

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